

AD

# INTERNATIONAL COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 17 January 2000 (17.01.00)	
<b>International application No.</b> PCT/IE99/00049	<b>Applicant's or agent's file reference</b> 30789WO
<b>International filing date (day/month/year)</b> 03 June 1999 (03.06.99)	<b>Priority date (day/month/year)</b> 03 June 1998 (03.06.98)
<b>Applicant</b> CONNOLLY, Patrick, Joseph et al	

1. The designated Office is hereby notified of its election made:

☒

in the demand filed with the International Preliminary Examining Authority on:

20 December 1999 (20.12.99)

☐

in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland	<b>Authorized officer</b>  Juan Cruz
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

O'CONNOR, Donal, H.  
Cruickshank & Co.  
1 Holles Street  
Dublin 2  
IRLANDE

Date of mailing (day/month/year) 09 December 1999 (09.12.99)		
Applicant's or agent's file reference 30789WO		
<b>IMPORTANT NOTICE</b>		
International application No. PCT/IE99/00049	International filing date (day/month/year) 03 June 1999 (03.06.99)	Priority date (day/month/year) 03 June 1998 (03.06.98)
Applicant ALLIANCE INVESTMENTS LIMITED et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

AU,CN,EP,IL,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CU,CZ,DE,DK,EA,EE,ES,FI,GB,GE,GH,GM,HR,HU,  
ID,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,PL,PT,RO,RU,SD,SE,  
SG,SI,SK,SL,TJ,TM,TR,TT,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 09 December 1999 (09.12.99) under No. WO 99/62454

**REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)**

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

**REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))**

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>30789W0</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/IE 99/ 00049</b>	International filing date (day/month/year) <b>03/06/1999</b>	(Earliest) Priority Date (day/month/year) <b>03/06/1998</b>
Applicant <b>ALLIANCE INVESTMENTS LIMITED et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IE 99/00049

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61G7/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	/ DE 44 29 062 A (WIENAEBER MANFRED ;LUDWIG MANFRED DR MED (DE)) 22 February 1996 (1996-02-22)	1
A	column 4, line 15 -column 6, line 15; figures 1-5 ----	19
A	✓ WO 97 22323 A (ALLIANCE INVESTMENTS LTD ;CONNOLLY PATRICK J (IE)) 26 June 1997 (1997-06-26) cited in the application the whole document ----	1, 12, 16, 19
A	/ WO 96 27356 A (ALLIANCE INVESTMENTS LTD ;CONNOLLY PATRICK JOSEPH (IE); KEENAN EUG) 12 September 1996 (1996-09-12) page 18, line 3 - line 13; figures 1-10, 19 ----- -/-	1, 20

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## ° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

17 September 1999

Date of mailing of the international search report

23/09/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Baert, F

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IE 99/00049

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 434 165 A (KEANE FRANCIS XAVIER) 25 March 1969 (1969-03-25) column 1, line 25 -column 2, line 29; figures -----	1
A	GB 1 516 488 A (KEANE F) 5 July 1978 (1978-07-05) page 1, line 50 - line 66; figures -----	12

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IE 99/00049


Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 4429062	A	22-02-1996	NONE		
<hr/>					
WO 9722323	A	26-06-1997	AU	1808997 A	14-07-1997
			CA	2240732 A	26-06-1997
			EP	0877590 A	18-11-1998
<hr/>					
WO 9627356	A	12-09-1996	AU	4952596 A	23-09-1996
			CA	2214804 A	12-09-1996
			EP	0814741 A	07-01-1998
			IE	960166 A	18-09-1996
			IE	75064 B	27-08-1997
<hr/>					
US 3434165	A	25-03-1969	NONE		
<hr/>					
GB 1516488	A	05-07-1978	IE	43026 B	03-12-1980
			US	4107490 A	15-08-1978

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>30789WO</b>		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/IE99/00049</b>	International filing date (day/month/year) <b>03/06/1999</b>	Priority date (day/month/year) <b>03/06/1998</b>	
International Patent Classification (IPC) or national classification and IPC <b>A61G7/00</b>			
Applicant <b>ALLIANCE INVESTMENTS LIMITED et al.</b>			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>			
Date of submission of the demand <b>20/12/1999</b>		Date of completion of this report <b>04.03.2000</b>	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer  <b>Arjona Lopez, G</b>  Telephone No. +49 89 2399 2546	



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IE99/00049

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-20 as originally filed †

**Claims, No.:**

1-22 as originally filed

**Drawings, sheets:**

1/17-17/17 as originally filed

**2. The amendments have resulted in the cancellation of:**

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

**4. Additional observations, if necessary:**



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IE99/00049

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-22
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-22
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-22
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**s e separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IE99/00049

**To point V:**

1. Reference is made to following document cited by the applicant and in the International Search Report:

D1: WO-A-97/22323

D2: DE-A-4 429 062

2. Document D1, which is considered to represent the most relevant state of the art, discloses (cf. abstract, figure 2) a therapeutic bed comprising a base frame (4), a patient support platform (5) rotatably mounted on the base frame (4) for rotational movement about a longitudinal rotational axis of the patient support platform (5), and drive means (26,27) for rotation of the patient support platform on the base frame (4), from which the subject-matter of claim 1 differs in that:

a)- guide means for patient care lines are provided at one or both ends of the patient support platform for guiding the patient care lines between a patient on the patient support platform and associated apparatus externally of the patient support platform, said guide means being mounted at or adjacent the longitudinal rotational axis of the patient support platform.

- 2.1 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).
- 2.2 The problem to be solved by the present invention may therefore be regarded as to provide a therapeutic bed with means for preventing the patient care lines of being entangled while rotating the patient support platform.
- 2.3 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT), since as no guide means for patient care lines have been previously disclosed in the prior art, it would not be obvious for the man skilled in the art, to apply the features under point V-2.a above to the therapeutic bed of document D1, in order to solve the problem posed.
  - 2.3.1 In particular, Document D2 is also silent to the mention of guide means for patient care lines. The feature with reference sign 35 in figure 4 (cf. also column

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IE99/00049

6, lines 8-13), i.e. the "Haltestange" are used to affix devices or infusions. No mention is done to the patient care lines or the way they can be guided.

3. Claims 2-22 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

**To point VII:**

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

The demand must be filed directly with the competent International Preliminary Examining Authority, or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority must be indicated by the applicant on the line below:

IPEA/ \_\_\_\_\_

# PCT

## CHAPTER II

### DEMAND

under Article 31 of the Patent Cooperation Treaty:  
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>	
Applicant's or agent's file reference 30789WO	
International application No. PCT/IE99/00049	International filing date (day/month/year) 3/06/1999
(Earliest) Priority date (day/month/year) 3/06/1998	
Title of invention A therapeutic bed	
<b>Box No. II APPLICANT(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  ALLIANCE INVESTMENTS LIMITED An Irish Company Monksland Industrial Estate Athlone County Westmeath Ireland	
Telephone No.:	
Facsimile No.:	
Teleprinter No.:	
State (that is, country) of nationality: IE	State (that is, country) of residence: IE
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  CONNOLLY, Patrick Joseph Lissoy The Pigeons Athlone County Westmeath Ireland	
State (that is, country) of nationality: IE	State (that is, country) of residence: IE
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  VIJAYENDRAN, Chinnathamby 577 Stoney Stanton Road Coventry CV6 5ED England	
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.	

**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

O'CONNOR Donal H. SCHUTTE Gearoid

of

CRUICKSHANK &amp; CO., 1 Holles Street, Dublin 2, Ireland

Telephone No.:

(01) 661 2533

Facsimile No.:

(01) 661 2480

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filedthe description ☒ as originally filed☐ as amended under Article 34the claims ☒ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☒ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

## Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- |  |   |        |
|--|---|--------|
| 1. translation of international application                              | : | sheets |
| 2. amendments under Article 34   | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19  | : | sheets |
| 5. letter  | : | sheets |
| 6. other (specify)   | : | sheets |

For International Preliminary Examining Authority use only

received                      not received

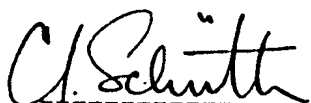
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- |  |   |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet                             | 4. <input type="checkbox"/> statement explaining lack of signature                                  |
| 2. <input type="checkbox"/> separate signed power of attorney                            | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (specify):  |

## Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

  
SCHUTTE, Gearoid

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

- |  |   |
|--|---|
| 3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.                        | <input type="checkbox"/> The applicant has been informed accordingly. |
| 4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.                               |   |
| 5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. |   |

For International Bureau use only

Demand received from IPEA on:

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) 30789W0

<b>Box No. I TITLE OF INVENTION</b>	
A therapeutic bed	
<b>Box No. II APPLICANT</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	
ALLIANCE INVESTMENTS LIMITED Monksland Industrial Estate Athlone County Westmeath Ireland	
<input type="checkbox"/> This person is also inventor.	
Telephone No.	
Facsimile No.	
Teleprinter No.	
State (that is, country) of nationality: IE	State (that is, country) of residence: IE
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<b>Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	
CONNOLLY, Patrick Joseph Lissoy The Pigeons Athlone County Westmeath Ireland	
This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)	
State (that is, country) of nationality: IE	State (that is, country) of residence: IE
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
<b>Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE</b>	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
O'CONNOR, Donal H and SCHUTTE, Gearoid of CRUICKSHANK & CO., 1 Holles Street, Dublin 2, Ireland	
Telephone No. (01) 661 2533	
Facsimile No. (01) 661 2480	
Teleprinter No.	
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

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577 Stoney Stanton Road  
Coventry CV6 5ED  
England

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item (1) 03/06/1998	S98 0415	IE		IE
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Figure of the drawings which should accompany the abstract: Fig. 1

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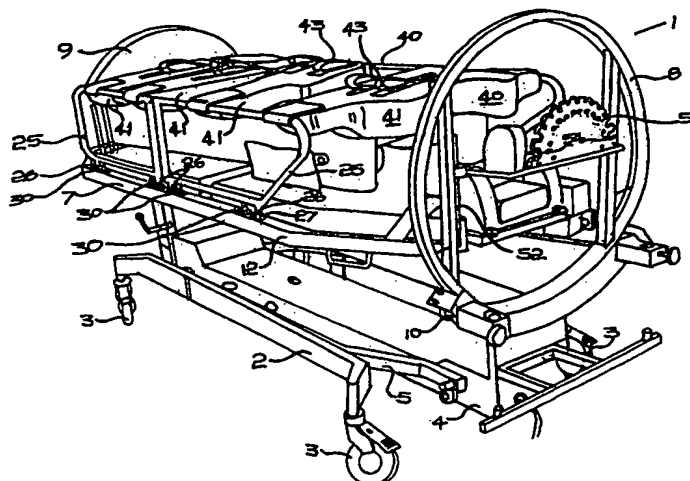
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/IE99/00049 (22) International Filing Date: 3 June 1999 (03.06.99) (30) Priority Data: S980415                      3 June 1998 (03.06.98)                      IE (71) Applicant (for all designated States except US): ALLIANCE INVESTMENTS LIMITED [IE/IE]; Monksland Industrial Estate, Athlone, County Westmeath (IE). (72) Inventors; and (75) Inventors/Applicants (for US only): CONNOLLY, Patrick, Joseph [IE/IE]; Lissoy, The Pigeons, Athlone, County Westmeath (IE). VIJAYENDRAN, Chinnathamby [GB/GB]; 577 Stoney Stanton Road, Coventry CV6 5ED (GB). (74) Agents: O'CONNOR, Donal, H. et al.; Cruickshank & Co., 1 Holles Street, Dublin 2 (IE).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DE (Utility model), DK, DK (Utility model), EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>	

(54) Title: A THERAPEUTIC BED



## (57) Abstract

A therapeutic bed (1) comprises a patient support platform (7) rotatably mounted on a base frame (4) for rotation about a longitudinal pivot axis between a supine support position and a prone support position. The base frame (4) is in turn mounted on a wheeled chassis (2) by pivot linkages (5) which allow tilting and raising and lowering of the base frame (4) on the chassis (2). Drive interlocks prevent rotation of the patient support platform (7) unless side rails (25) are locked on the patient support platform (7) and patient support flaps (40, 41), extending between the side rails (25) are locked together to secure a patient on the patient support platform (7). Guides (51) are provided at each end of the patient support platform (7) at the longitudinal rotational axis to guide patient care lines between a patient on the patient support platform (7) and associated devices externally of the patient support platform (7). This prevents entanglement of patient care lines as the patient support platform (7) rotates.

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"A Therapeutic Bed"Background of the Invention

5 This invention relates to a therapeutic bed, and in particular to prone positioning beds.

10 Patient positioning has been used for some time as a treatment for patient comfort, to prevent skin breakdown, improve drainage and to facilitate breathing. One of the goals of patient positioning has been maximisation of ventilation to improve systematic oxygenation. Various studies have demonstrated the beneficial effects of body positioning and mobilisation on impaired oxygen transport. The support of patients in a prone position can be  
15 advantageous in enhancing extension and ventilation of the dorsal aspect of the lungs.

20 The present invention particularly relates to therapeutic beds of the type comprising a base frame, a patient support platform rotatably mounted on the base frame for rotational movement about a longitudinal rotational axis of the patient support platform, and drive means for rotation of the patient support platform on the base frame.

25 In our previously filed patent application, publication no. WO 97\22323, we described a therapeutic bed of this type for supporting a patient in either a supine position or a prone position and for using kinetic therapy.

30 This type of bed is particularly suited for the treatment of patients with respiratory problems. The beds advantageously allow rotation of the patient on the patient support platform and, where required, rotation of  
35 the patient support platform into a prone support position

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which is particularly desirable in the treatment of patients with severe respiratory problems.

5 In such therapy, a patient may be heavily intubated with a number of tubes extending over a side of the bed between the patient on the bed and associated apparatus mounted on stands or the like alongside the bed for either delivering liquids to the patient or draining liquids from the patient. Also, there may be a number of wires extending  
10 from sensors on the patient to various monitors adjacent the bed. These ventilation and drainage tubes, medication supply tubes, monitoring cables and the like are collectively called patient care lines throughout this patent specification. The term "patient care lines" as  
15 used in this patent specification is taken to mean any tubes, pipes, conduits, cables and the like lines for delivery or drainage of fluids to or from a patient, for monitoring a patient's condition and generally speaking for treating a patient on the patient support platform of  
20 the bed. These patient care lines present a problem, particularly when rotating the patient support platform between a supine support position and a prone support position, in that they can easily become entangled and may be inadvertently pulled away from the patient. To avoid  
25 this a nurse or other attendant has to carefully handle and adjust the patient care lines as necessary whilst the bed is rotating. This can be extremely awkward. Access to the patient and the patient care lines is difficult when the patient support platform is at or approaching the  
30 prone support position.

Another problem that arises is in ensuring that the patient is correctly secured to the patient support platform before rotating the patient support platform away  
35 from a horizontal supine support position. Again, a nurse has to check all the patient retaining strapping, rails

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and supports are secure prior to rotation of the patient support platform into the prone support position. This tends to be very time consuming. Also, it is not always easy to check the strapping or other restraints are  
5 correctly and securely engaged.

To rotate the patient support platform between the supine support position and the prone support position, typically a number of nursing staff are required to rotate the  
10 patient support platform and at the same time, handle the tubing and wiring to prevent entanglement or dislodgement. Thus, a number of nursing staff may be diverted from other duties for a considerable time. Consequently, the operational efficiency is adversely effected and costs  
15 increased for the hospital.

The present invention is directed towards overcoming these problems.

## 20 Summary of the Invention

The invention is characterised in that there is provided guide means for patient care lines at one or both ends of the patient support platform for guiding the patient care  
25 lines between a patient on the patient support platform and associated apparatus externally of the patient support platform, said guide means being mounted at or adjacent the longitudinal rotational axis of the patient support platform.

30 Advantageously, the invention provides a bed incorporating a patient care line management system for optimum handling of patient care lines particularly when rotating the bed between a supine support position and a prone support  
35 position. The risk of entanglement or dislodgement of the patient care lines is minimised as the lines are securely

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supported by the guide means during rotation of the patient support platform.

5 In a second aspect, the invention is characterised in that there is provided a retaining means, for releasably securing a patient on the patient support platform, the retaining means being operatively connected to the drive means for rotation of the patient support platform to regulate rotation of the patient support platform in  
10 response to correct engagement of the retaining means. This construction advantageously prevents rotation of the patient support platform unless the patient is securely strapped or otherwise restrained on the patient support platform. Also, it gives a simple and quick indication to  
15 nursing staff as to whether or not the patient is properly secured on the patient support platform.

In a third aspect, the invention is characterised in that there is provided drive means which is operable for  
20 rotation of the patient support platform on the base frame, means for sensing the orientation of the patient support platform on the base frame, and means for controlling operation of the drive means in response to the sensed position of the patient support platform on the  
25 base frame. In this way, the rotation of the patient support platform can be readily controlled in a simple manner to rotate the patient support platform between a number of desirable orientations on the base frame. Also, the base support platform can be controlled to move  
30 between different orientations leaving a nurse free to attend to the patient if necessary while this is being carried out.

In one embodiment, means is provided for securing the  
35 patient care lines on the guide means.



- 5 -

In another embodiment, the guide means comprises a tubular guide for through passage of the patient care line or lines.

5. In a further embodiment, the tubular guide has a bore for through passage of the patient care lines and a bore insert is provided for engagement within the bore, the bore insert having a number of spaced-apart slots about a periphery of the insert, each slot for receipt of a patient care line, each slot being closed by a side wall of the bore when the insert is mounted within the bore.

- 10 In another embodiment, the guide means comprises a guide body having a number of patient care line receiving slots for reception of the patient care lines.

- 15 In a further embodiment, the guide means has a guide body with a number of spaced-apart peripheral slots for reception of patient care lines.

- 20 Preferably, each slot has a side opening, and closure means is engagable across the side opening to releasably retain a line within the slot.

- 25 In another embodiment, the closure means is a spring-loaded finger normally biased into a slot closing position across the side opening and retractable against spring bias for insertion and removal of a line into or from the slot.

- 30 Preferably, the closure means is a quick-release strip engagable across the side opening.

- 35 In a further embodiment, the guide body is movably mounted on the patient support platform for vertical movement of the guide body on the patient support platform.

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Preferably, the guide body is slidably mounted on the patient support platform.

- 5 In another embodiment of the invention, there is provided retaining means for releasably securing a patient on the patient support platform,

10 said retaining means being operatively connected to the drive means to regulate rotation of the patient support platform in response to correct engagement of the retaining means.

15 In a further embodiment, the retaining means comprises a number of pairs of support elements mounted between a head end and a foot end of the patient support platform,

20 each pair of support elements comprising associated support elements mounted on opposite sides of the patient support platform and having a fastener to secure the support elements together to retain a patient on the patient support platform,

25 sensing means associated with each fastener to sense correct engagement of the fastener,

said sensing means being connected to a controller for controlling operation of the drive means.

- 30 In another embodiment, each fastener has a complementary pair of fastener parts, namely a first fastener part and a second fastener part,

35 one fastener part being mounted on each of the pair of support elements,

- 7 -

the first fastener part being normally biased out of engagement with the second fastener part,

5 the first fastener part co-operating with the sensor when in an engaged position to indicate that the fastener parts are engaged.

10 In a further embodiment, the sensor has a magnetically operated switch and an operating magnet is mounted on the first fastener part to operate the switch.

15 In another embodiment, the support elements are mounted on side rails upstanding at each side of the patient support platform.

Preferably, each side rail is removably mounted on the patient support platform having means for releasably engaging the patient support platform,

20 locking means to secure the rail on the patient support platform,

25 rail sensing means to sense interlocking engagement of the rail with the patient support platform,

30 said rail sensing means being operatively connected to the controller for the drive means such that the drive means will only operate if the rail is correctly engaged with the patient support platform.

In another embodiment, means is provided to lock each rail on the patient support platform when the patient support platform is in an inverted position.

35 In a further embodiment, one or more hinged panels are provided in the patient support platform to provide access

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to a patient when the patient support platform is in an inverted position,

5        each panel having panel locking means to secure the panel in a closed position on the patient support platform,

10       panel sensing means being provided to sense locking engagement of the panel with the patient support platform,

15       said panel sensing means being operatively connected to the controller for the drive means such that the drive means will only operate if the panel is locked in a closed position on the patient support platform.

20       In another embodiment, there is provided means for sensing the orientation of the patient support platform on the base frame, and means for controlling operation of the drive means in response to the sensed position of the patient support platform on the base frame.

25       In a further embodiment, the sensing means comprises a ring mounted on the patient support platform co-axially with the rotational axis of the patient support platform,

30       the ring having a first series of slots spaced at 1° intervals about the ring,

35       the ring having a number of sets of location slots spaced-apart about the ring, each set of location slots giving an indication of a particular orientation of the patient support platform relative to the base frame,

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and a complementary position reader associated with the disc, the position reader being mounted on the base frame and having complementary light emitter and receiver pairs supported at opposite sides of the disc for cooperation with the slots in the disc to determine the orientation of the patient support platform on the base frame.

In another embodiment, the ring has a number of parking slots located about the ring defining a number of parking locations for the patient support platform on the base frame at which a locking bolt is engagable between the patient support platform and the base frame to lock the patient support platform on the base frame.

15

#### Brief Description of the Drawings

The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a therapeutic bed according to the invention;

25

Fig. 2 is a another perspective view of the therapeutic bed, shown in another position of use;

Fig. 3 is a further perspective view of the bed with a patient support platform of the bed shown in an inverted prone patient supporting position;

30

Fig. 4 is an end elevational view of the bed;

35

Fig. 5 is a perspective view of a frame of the therapeutic bed;

- 10 -

Fig. 6 is a perspective view of a base portion of the bed frame with a patient support platform of the bed removed;

5

Fig. 7 is an elevational view of a frame of the bed;

Fig. 8 is a plan view of the bed frame shown in Fig. 7;

10

Fig. 9 is a plan view similar to Fig. 8 showing hinged panels of the patient support platform in place on the bed frame;

15

Fig. 10 is a perspective view of the bed in use and supporting a patient in a supine position;

Fig. 11 is a perspective view of the bed in use, supporting a patient in a prone position;

20

Fig. 12 is a detail exploded sectional view of a side rail locking mechanism for the bed;

25

Fig. 13 is a detail sectional elevational view of a side rail locking mechanism for the bed shown in another position of use;

30

Fig. 14 is a sectional elevational view of a panel locking mechanism on the patient support platform;

Fig. 15 is an enlarged detail sectional view of portion of the locking mechanism of Fig. 14;

35

Fig. 16 is a view similar to Fig. 15 showing the locking mechanism in another position of use;

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Fig. 17a is a detail perspective view of patient retaining flaps of the bed;

5 Fig. 17b is a circuit diagram for a rotational interlock incorporated in the flaps;

Fig. 17c is a detail perspective view of a patient retaining strap and buckle for securing the flaps;

10 Fig. 18 is an elevational view showing a tube guide at one end of the bed;

15 Fig. 19 is a detail elevational view of a rotary encoder ring forming portion of a rotational control mechanism for the patient support platform of the bed;

20 Fig. 20 is a detail side elevational view of a rotary encoder forming portion of the bed; and

Fig. 21 is a detail view showing portion of the rotary encoder ring.

### Detailed Description of the Invention

25

Referring to the drawings there is illustrated a therapeutic bed according to the invention indicated generally by the reference numeral 1. The bed 1 comprises a ground engaging chassis 2 mounted on wheels 3. A base frame 4 is secured on the chassis 2 by pivot linkages 5. Rams 6 housed within the base frame 4 operate the pivot linkages 5 to raise and lower the base frame 4 on the chassis 2. The rams 6 may be operated to keep the base frame 4 level as it moves or may be operated to raise or lower one of the ends of the base frame 4 to tilt the base frame 4 about a transverse axis of the base frame 4 to

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move a patient support platform 7 carried on the base frame 4 into a Trendelenburg position. The patient support platform 7 is rotatably mounted on the base frame 4 for rotation about a longitudinal rotational axis of the patient support platform 7 between a supine support position shown in Fig. 1 and a prone support position shown in Fig. 3.

The patient support platform 7 has a pair of upright end rings 8,9 each of which sits on and rotatably engages an associated pair of spaced-apart rollers 10 (Fig. 6) at each end of the base frame 4. Side support bars 12,13 extend between the end rings 8,9. A central cross bar 14 extends between the side support bars 12,13. Hinged panels 16,17 (Fig. 9) are hingedly connected to the cross bar 14 and can be opened when the bed 1 is in the prone position as illustrated in Fig. 3 for access to the back of a patient on the bed 1. It will be noted that this construction gives good access to the patient with minimal obstruction.

A slap shut mechanism 20 (Figs. 9 and 14 to 16) is mounted on each panel 16,17 for engagement with the support bars 12,13 to securely lock the panels 16,17 in the closed position. A spring loaded locking pin 22 is slidably mounted within an elongate tubular housing 23 for movement between a retracted stored position (Fig. 15) and an extended position (Fig. 16) in which the locking pin 22 engages in an associated receiver slot 23a in the support bars 12,13. Sensors (not shown) detect correct locking engagement of each locking pin 22 with its associated receiver slot 23a and sends a signal to a rotational controller for the patient support platform 7 which prevents rotation of the patient support platform 7 unless both panels 16, 17 are securely locked on the patient support platform 7. A gravity pin 21 is slidable under



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gravity in an associated tube 21a on the housing 23 side wall for engagement with a complementary circumferential groove 24 in the locking bolt 22 when the patient support platform 7 is in the supine position to prevent opening of the panels 16, 17, the gravity pin 21 sliding out of engagement with the groove 24 when the patient support platform is in the prone position to allow opening of the panels 16, 17. A handle 98 is provided at an inner end of the locking pin 22 for manual release of the locking pin 22 which can be retracted against spring 99 within the housing 23. Thus, the panels 16, 17 are released for opening. In the retracted position, Figs. 14, 15, a spring loaded catch 100 mounted on the locking pin 22 engages a slot 101 in a side wall of the housing 23 to retain the locking pin 22 in the retracted position. The catch 100 can be pressed into the housing 23 against spring 105 bias to release the locking pin 22 which is then urged outwardly by spring 99 into the outwardly extending engagement position shown in Fig. 16 for re-locking the panels 16, 17 on the patient support platform 7.

At each side of the patient support platform 7 upstanding side rails 25 are provided. Each side rail 25 has a downwardly extending stanchion 26 at each end which is engagable with a complementary socket 27 (see Fig. 13) in one of the support bars 12,13 of the patient support platform 7. Upon engagement of the stanchion 26 with the socket 27 a spring loaded locking pin 28 housed within the bar 12,13 is engagable through an opening 24 in the side wall of the socket 27 with a locking slot 29 in the stanchion 26. A handle 30 at an inner end of the locking pin 28 is operable to slide the locking pin 28 in an associated housing 31 housed within the bar 12, 13 for release of the stanchion 26. A spring 31a within the housing 31 urges the locking pin 28 outwardly of the

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housing 31 into a stanchion engaging position. It will be noted that an associated gravity operated retaining pin 32 is slidably mounted in a tubular casing 33 on the housing 31 such that when the patient support platform 7 is in the inverted prone position the pin 32 drops downwardly under gravity (in the direction of arrow A, Fig. 13) to prevent retraction of the pin 28 locking the rails 25 in position.

5 A sensor 35 is engagable with each pin 28 to determine the position of the pin 28 to register if the pin 28 is engaged or disengaged with the stanchion 26. All of the sensors 35 are connected in series and are connected to a rotational controller for a motor which rotates the patient support platform 7 such that the motor will not operate until all the sensors 35 indicate that the pins 28 are properly engaged with the stanchions 26 so that the rails 25 are securely attached to and locked in position on the patient support platform 7.

To retain a patient on the patient support platform 7, associated pairs of patient support flaps 40,41 (Fig. 1) are pivotally mounted on opposite side rails 25 and can be secured together by locking straps 43 to securely retain a patient on the patient support platform 7 as described in our previous patent application Publication No. WO97/22323 (the details of which are incorporated herein by reference). Each strap 43 comprises a web 44 with either a buckle 45 (Fig. 17) or associated clip 46 at a free end of the web 44, the buckle 45 and clip 46 forming a quick release fastener. The web 44 when the buckle 45 is released is shortened by an elastic band 47, which is sewn in a stretched position onto one side of the web 44, to withdraw the buckle 45 from over a magnetically operated switch 48 mounted on the associated flap 41 on which the buckle 45 is mounted. The magnetic switch 48 is mounted inside each flap 41 and immediately below the magnet in the tightened buckle 45. A series circuit of the magnetic

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switch 48 and a resistor 49 terminates in a connector 49a which is accessible on an exterior of the flap 41. By choosing a unique value of resistor for each flap 41 and measuring it, correct closure of each buckle 45 can be  
5 validated. Thus, when the buckle 45, which incorporates a small magnet, is in the engaged position the magnetically operated switch 48 is operable to confirm that the buckles 45 and clips 46 are correctly joined and the patient is thus correctly secured on the patient support platform 7.  
10 Each of the fasteners must be correctly engaged before the patient support platform 7 can be rotated.

A hand-held controller 85 (Fig. 4) is mounted in a pocket 86 at the foot of the bed 1. This controller 85 has a  
15 contact for engagement with the connector 49a to allow the controller 85 to check the buckle 45 is properly engaged (the switch 48 is closed) and determine the value of the resistance 48 to identify the flaps 40, 41 being checked. Each of the flap pairs 40, 41 are checked in sequence  
20 starting at the foot of the bed and moving towards the head end of the bed. Preferably, the patient support platform 7 will not be released for rotation unless flap locking is confirmed in the correct sequence and the sequence is complete. This ensures all the flaps are  
25 checked together at the same time.

Assuming all the interlocks are clear, the hand-held controller 85 can be used to remotely send an operating signal to the rotation motor controller to rotate the  
30 patient support platform 7. A nurse can move around the bed 1 as the patient support platform 7 rotates, controlling rotation with the controller 85 to ensure there are no problems with the patient or the patient care lines during rotation.

35 Management means for patient care lines such as tubes and

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sensor cables is provided on the bed. At a foot end of the bed the management means comprises a central opening 50 (Fig. 5) adjacent a longitudinal axis of the patient support platform 7 for supporting and through passage of the patient care lines. A care line holder 57 (Fig. 4) is removably engagable within the opening 50 and has a number of spaced-apart circumferential slots 58 each for reception of a patient care line. Each slot 58 is closed by the side wall of the opening 50.

At a head end of the bed the patient care line management means comprises a guide body 51 (Figs. 1 and 18) mounted adjacent the longitudinal axis of the patient support platform 7 and slidable on associated rails 52 so that it drops beneath the head of the patient when the bed is in either the supine or the prone position. The guide 51 has a number of slots 54 for reception of patient care lines. The slots 54 may be of different sizes as shown to accommodate different lines. When the patient care lines are engaged with the slots 54, a spring loaded retaining finger 55 mounted across the inlets of each slot 54 retains the patient care line within the slot 54. The guide body 51 is mounted on a rod 56 which is rotatably mounted on sliders 59 which slidably engage the rails 52.

Thus, the guide body 51 can be rotated out of the way for better access to a patient's head if necessary. It will be appreciated that this patient care line management by leading the patient care lines axially outwardly at each end of the bed greatly facilitates handling of the patient care lines when moving the patient support platform between the supine and prone support positions. Also, the patient care lines are securely held to prevent inadvertent withdrawal from a patient.

A drive for the patient support platform can be of the type described in our Patent Specification No. WO97/22323

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(the details of which are incorporated by reference), essentially comprising a belt drive between the patient support platform 7 and an associated electric motor on the base frame 4 at a foot end of the bed 1. In this case  
5 however operation of the motor is controlled by a rotary opto encoder comprising a code disc 60 with three concentric tracks of slots 61, 62, 63, see Figs. 19 to 21 and a complementary position reader 64. An outer angle track 61 comprises slots at 1° intervals. An intermediate  
10 track 62 has slots to provide index identification and an inner index track 63 has slots in line with the lock ring park position. The disc 60 is attached to the patient support platform 7 and the associated position reader 64 is mounted on the base frame 4. The position reader 64  
15 has a channel 64a for reception and through passage of an outer portion of the disc 60. Light emitters 65 are mounted at one side of the channel 64a and complementary light receivers 66 are mounted at the opposite side of the channel 64a. The emitters 65 and receivers 66 co-operate  
20 with the associated slots 61, 62, 63 in the disc 60 to indicate the orientation of the patient support platform 7 on the base frame 4. Seven infra-red emitter/detector pairs 65, 66 are used in the optical system to decode the positional information. The outer track 61 comprises 360  
25 sets of slots 70 and spaces 71. Ideally, a slot 70 occupies 0.5 degree of the circle, a slot 70 and space 71 together occupying 1 degree. The inner track 63 consists of a number of narrow slots 74, each corresponding to a locking position in which an associated locking bolt 75  
30 (Fig. 7) is engagable between the base frame 4 and the patient support platform 7. The locking bolt 75 is slidably mounted on the base frame 4 for engagement with and release from associated locking hobs on the ring 9 of the patient support platform 7. The locking pin 75 serves  
35 to mechanically anchor the patient support platform 7 on the base frame 4 and also operates an on/off switch for

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the rotation motor, preventing operation of the motor when the locking pin 75 is engaged with the patient support platform 7. Each slot 74 should be exactly in line with the centre of an associated locking hole 75a on the patient support platform 7, the narrowness of the slot 74 determining the accuracy of lock positioning. The intermediate track 62 is used to assign a unique binary code to each locking position 1. Each locking position has a set of holes 76 (varying in number from one to four holes 76). The unique pattern of holes 76 at each locking position conveys locking angle information to the controller for controlling rotation of the patient support platform 7. The binary pattern of the holes is shown in the table below.

15

LockPin position		Holes 76 (Fig. 21)			
		D	C	B	A
20	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
25	6	0	1	1	0
	7	0	1	1	1
	8	1	0	0	0
	9	1	0	0	1
	10	1	0	1	0

30

The binary weighting of the four holes are, A=1, B=2, C=4, D=8. In the table, the presence of a hole is indicated by 1, absence of a hole by 0.

35 Seven infra-red emitter detector pairs 65,66 are used in the optical system to decode the positional information.

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The emitter/detector pairs 65, 66 are positioned at A, B, C, D, I, X and Y as shown in Fig. 21.

When a detector 66 sees an emitter 65 through a slot or  
5 hole in the disc 60, it produces an output of "1".  
Otherwise, it produces an output of "0". The incremental  
angle and direction information are read by X and Y. Every  
time a slot 70 passes over detector X, the angle is  
incremented or decremented by one. There are two spaced-  
10 apart detectors X and Y for the outer track 61 and the  
order in which the detectors X and Y see the emitter  
determines the direction. There are four spaced-part  
emitter/detector pairs A, B, C, D associated with the  
intermediate track 62 and these supply the pattern  
15 information to the controller to compute the locking angle  
information. There is one emitter/detector pair I  
associated with the inner track 63 and this supplies the  
locking position information. As the patient support  
platform 7 rotates the spaces between the slots interrupt  
20 infra-red beams passing between emitters 65 and receivers  
66 on a support 67 on the base frame 4. Information from  
the infra-red detectors is processed by an optical  
processing controller to provide the angle of the patient  
support platform 7 which is indicated on a display screen  
25 80 (Fig. 4) at a foot end of the bed 1.

As can be seen in Fig. 7, the pivot linkages 5 have pivot  
arms 90, 91 having inner ends which pivotally engage the  
base frame 4 by pivot pins 92, 93. At one end of the bed  
30 1, an outer end of each pivot arm 90 pivotally engages the  
chassis 2 by a pivot pin 94, while at the other end of the  
bed 1, the outer end of each pivot arm 91 pivotally  
engages the chassis 2 by pivot pins 95 which are also  
longitudinally slidable in elongate slots 96 on the  
35 chassis 2. The rams 6 are operable to rotate the pivot  
pins 92, 93 on the base frame 4 for operation of the pivot

- 20 -

linkages 5.

In use, sensors associated with the side rails 25 and the panels 16, 17 on the patient support platform 7 are  
5 connected to the drive controller for the patient support platform 7 such that the patient support platform cannot be rotated unless all the locks are correctly engaged. Further the sensors for the straps of the patient retaining flaps 40, 41 also need to indicate correct  
10 engagement before the patient support platform 7 can be rotated. It will also be appreciated that the delivery of the patient care lines such as tubes and other cables and conduits axially outwardly at each end of the patient support platform greatly facilitates management of the  
15 patient care lines during movement of the patient support platform between the supine and prone positions.

It will be noted that when the patient support platform is rotated from the supine support position into the prone  
20 support position, it will rotate through 200° and then return to the 180° or zero prone position. This function will centre the patient on the bed 1.

It will be appreciated that the patient support platform  
25 may be oscillated on the base frame or may be locked in a number of fixed orientations on the base frame.

It will also be appreciated that the invention provides a patient care line guide system for a hospital bed for  
30 neatly guiding patient care lines off each end of the bed.

The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail within the scope of the appended  
35 claims.



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CLAIMS

1. A therapeutic bed comprising:
  - 5 a base frame,
  - a patient support platform rotatably mounted on the base frame for rotational movement about a longitudinal rotational axis of the patient
  - 10 support platform, and
  - drive means for rotation of the patient support platform on the base frame,
  - 15 characterised in that there is provided guide means for patient care lines at one or both ends of the patient support platform for guiding the patient care lines between a patient on the patient support platform and associated apparatus externally of the
  - 20 patient support platform, said guide means being mounted at or adjacent the longitudinal rotational axis of the patient support platform.
2. A therapeutic bed as claimed in claim 1, wherein
- 25 means is provided for securing the patient care lines on the guide means.
3. A therapeutic bed as claimed in claim 1 or 2 wherein the guide means comprises a tubular guide for through
- 30 passage of the patient care line or lines.
4. A therapeutic bed as claimed in claim 3, wherein the tubular guide has a bore for through passage of the patient care lines and a bore insert is provided for
- 35 engagement within the bore, the bore insert having a number of spaced-apart slots about a periphery of the

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insert, each slot for receipt of a patient care line, each slot being closed by a side wall of the bore when the insert is mounted within the bore.

- 5     5.     A therapeutic bed as claimed in claim 1 or 2 wherein the guide means comprises a guide body having a number of patient care line receiving slots for reception of the patient care lines.
- 10    6.     A therapeutic bed as claimed in claim 5 wherein the guide means has a guide body with a number of spaced-apart peripheral slots for reception of patient care lines.
- 15    7.     A therapeutic bed as claimed in claim 6 wherein each slot has a side opening, and closure means is engagable across the side opening to releasably retain a line within the slot.
- 20    8.     A therapeutic bed as claimed in claim 7 wherein the closure means is a spring-loaded finger normally biased into a slot closing position across the side opening and retractable against spring bias for insertion and removal of a line into or from the
- 25           slot.
9.     A therapeutic bed as claimed in claim 7 wherein the closure means is a quick-release strip engagable across the side opening.
- 30           10.    A therapeutic bed as claimed in any of claims 5 to 9 wherein the guide body is movably mounted on the patient support platform for vertical movement of the guide body on the patient support platform.
- 35           11.    A therapeutic bed as claimed in claim 10 wherein the

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guide body is slidably mounted on the patient support platform.

12. A therapeutic bed as claimed in any preceding claim  
5 wherein there is provided retaining means for releasably securing a patient on the patient support platform,

10 said retaining means being operatively connected to the drive means to regulate rotation of the patient support platform in response to correct engagement of the retaining means.

13. A therapeutic bed as claimed in claim 12 wherein the  
15 retaining means comprises a number of pairs of support elements mounted between a head end and a foot end of the patient support platform,

20 each pair of support elements comprising associated support elements mounted on opposite sides of the patient support platform and having a fastener to secure the support elements together to retain a patient on the patient support platform,

25 sensing means associated with each fastener to sense correct engagement of the fastener,

30 said sensing means being connected to a controller for controlling operation of the drive means.

14. A therapeutic bed as claimed in claim 13 wherein each  
fastener has a complementary pair of fastener parts, namely a first fastener part and a second fastener part,

35 one fastener part being mounted on each of the pair

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of support elements,

the first fastener part being normally biased out of engagement with the second fastener part,

5

the first fastener part cooperating with the sensor when in an engaged position to indicate that the fastener parts are engaged.

10 15. A therapeutic bed as claimed in claim 14 wherein the sensor has a magnetically operated switch and an operating magnet is mounted on the first fastener part to operate the switch.

15 16. A therapeutic bed as claimed in any of claims 13 to 13 wherein the support elements are mounted on side rails upstanding at each side of the patient support platform.

20 17. A therapeutic bed as claimed in claim 16 wherein each side rail is removably mounted on the patient support platform having means for releasably engaging the patient support platform,

25 locking means to secure the rail on the patient support platform,

rail sensing means to sense interlocking engagement of the rail with the patient support platform,

30

said rail sensing means being operatively connected to the controller for the drive means such that the drive means will only operate if the rail is correctly engaged with the patient support platform.

35

18. A therapeutic bed as claimed in claim 16 or claim 17

- 25 -

wherein means is provided to lock each rail on the patient support platform when the patient support platform is in an inverted position.

- 5 19. A therapeutic bed as claimed in any preceding claim wherein one or more hinged panels are provided in the patient support platform to provide access to a patient when the patient support platform is in an inverted position,

10

each panel having panel locking means to secure the panel in a closed position on the patient support platform,

15

panel sensing means being provided to sense locking engagement of the panel with the patient support platform,

20

said panel sensing means being operatively connected to the controller for the drive means such that the drive means will only operate if the panel is locked in a closed position on the patient support platform.

25

20. A therapeutic bed as claimed in any preceding claim wherein there is provided, means for sensing the orientation of the patient support platform on the base frame, and means for controlling operation of the drive means in response to the sensed position of the patient support platform on the base frame.

30

21. A therapeutic bed as claimed in claim 20, wherein the sensing means comprises a ring mounted on the patient support platform co-axially with the rotational axis of the patient support platform,

35

the ring having a first series of slots spaced at 1°

- 26 -

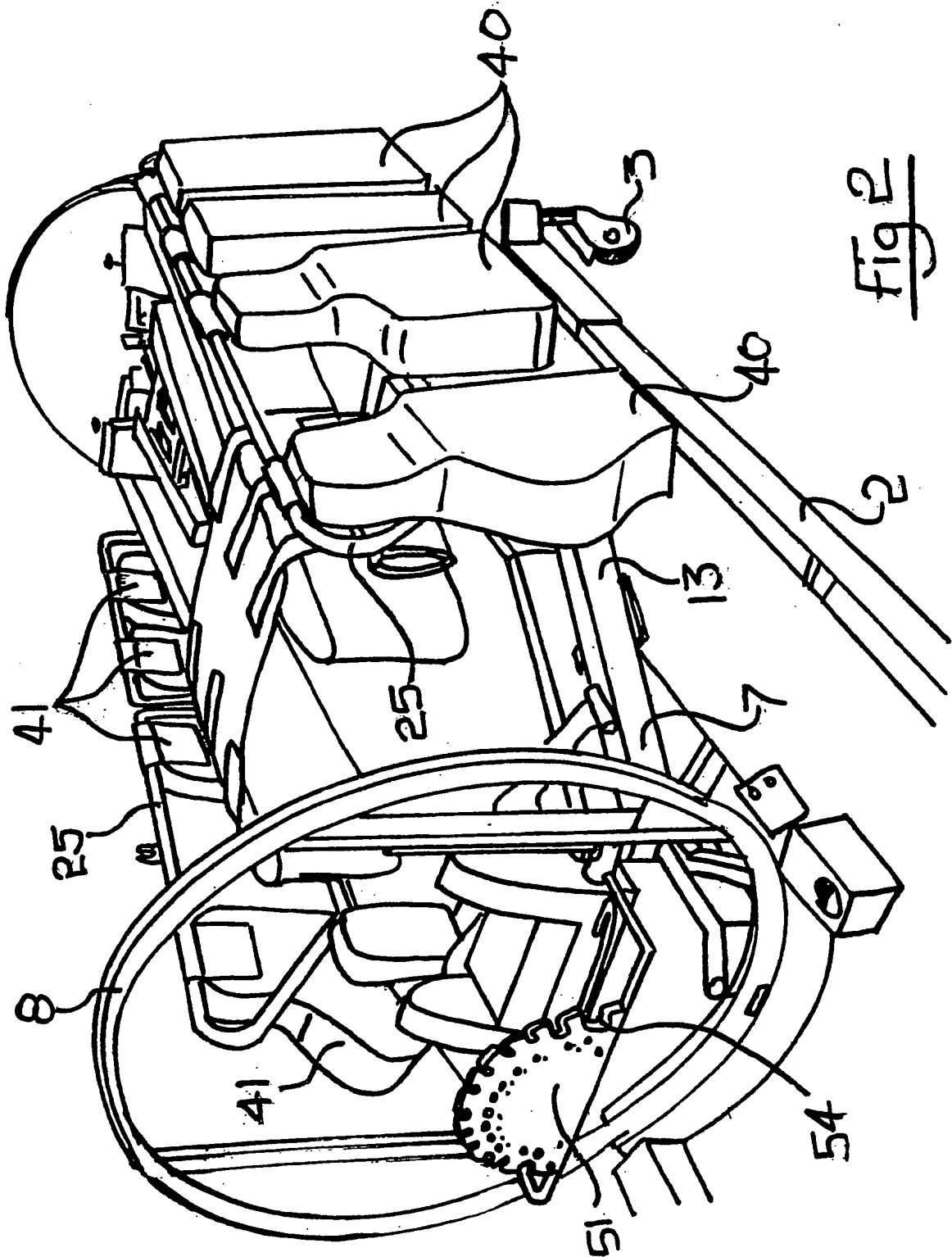
intervals about the ring,

the ring having a number of sets of location slots spaced-apart about the ring, each set of location slots giving an indication of a particular orientation of the patient support platform relative to the base frame,

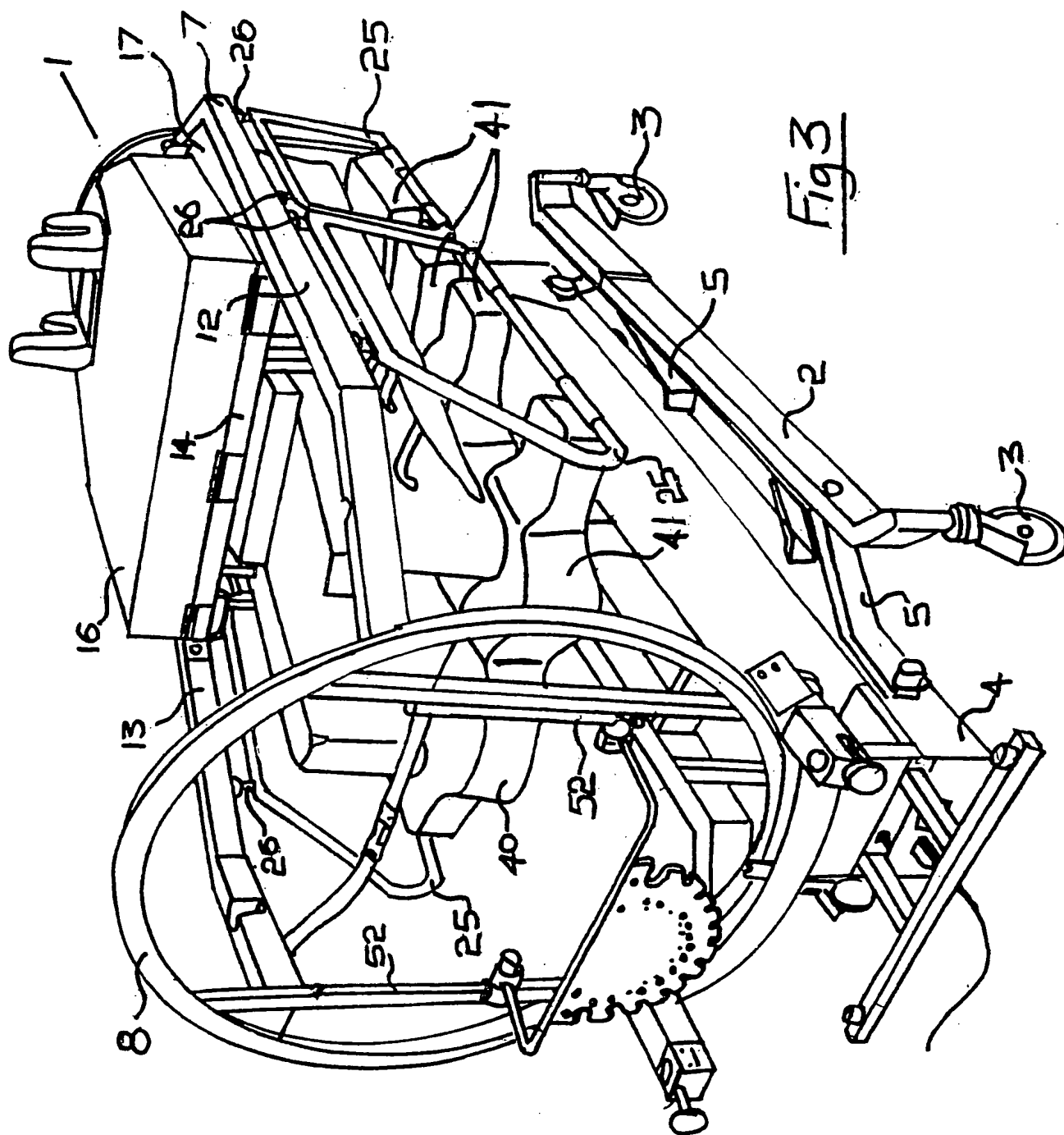
and a complementary position reader associated with the disc, the position reader being mounted on the base frame and having complementary light emitter and receiver pairs supported at opposite sides of the disc for cooperation with the slots in the disc to determine the orientation of the patient support platform on the base frame.

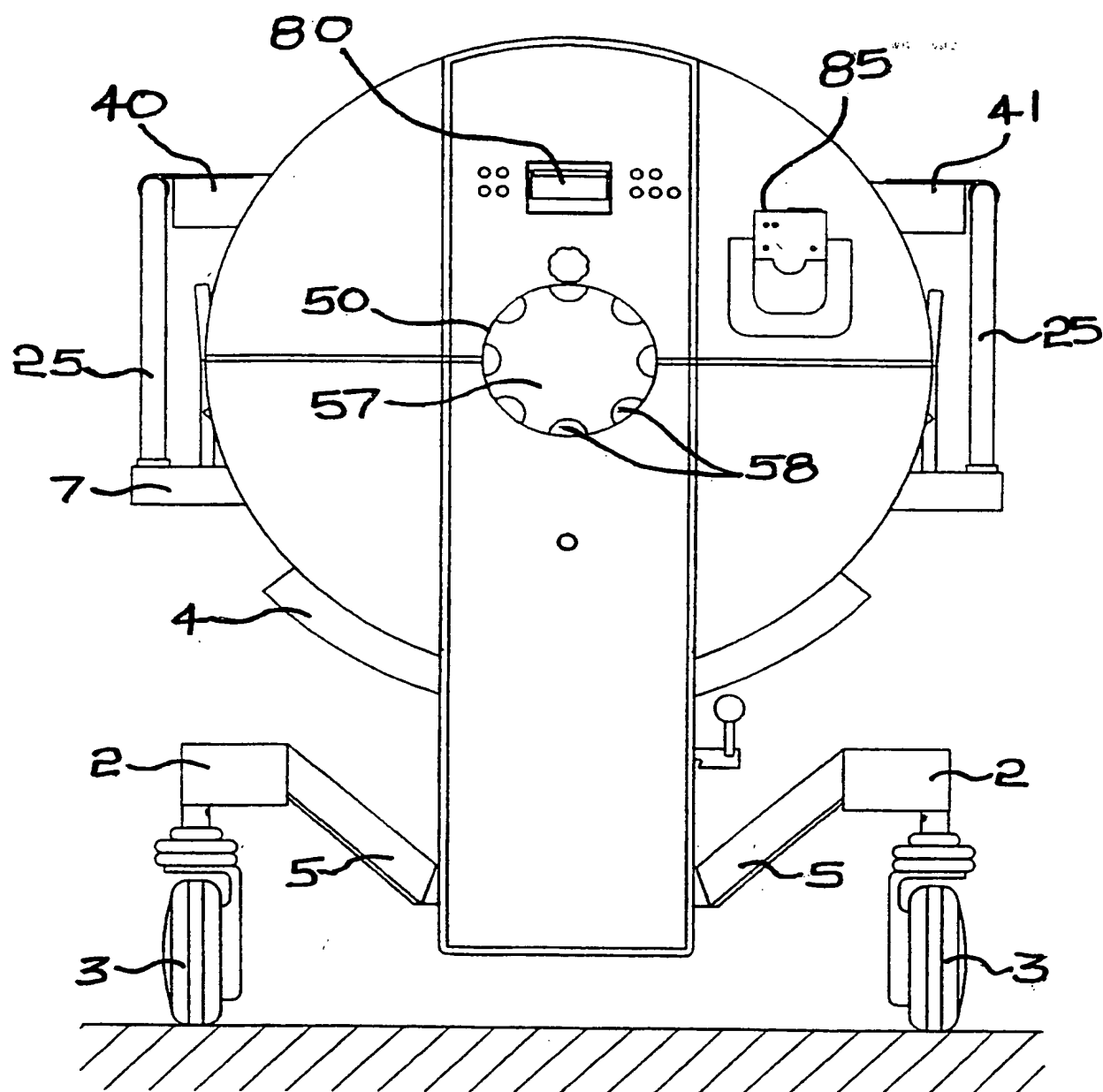
22. A therapeutic bed as claimed in claim 20 or claim 21 wherein the ring has a number of parking slots located about the ring defining a number of parking locations for the patient support platform on the base frame at which a locking bolt is engagable between the patient support platform and the base frame to lock the patient support platform on the base frame.

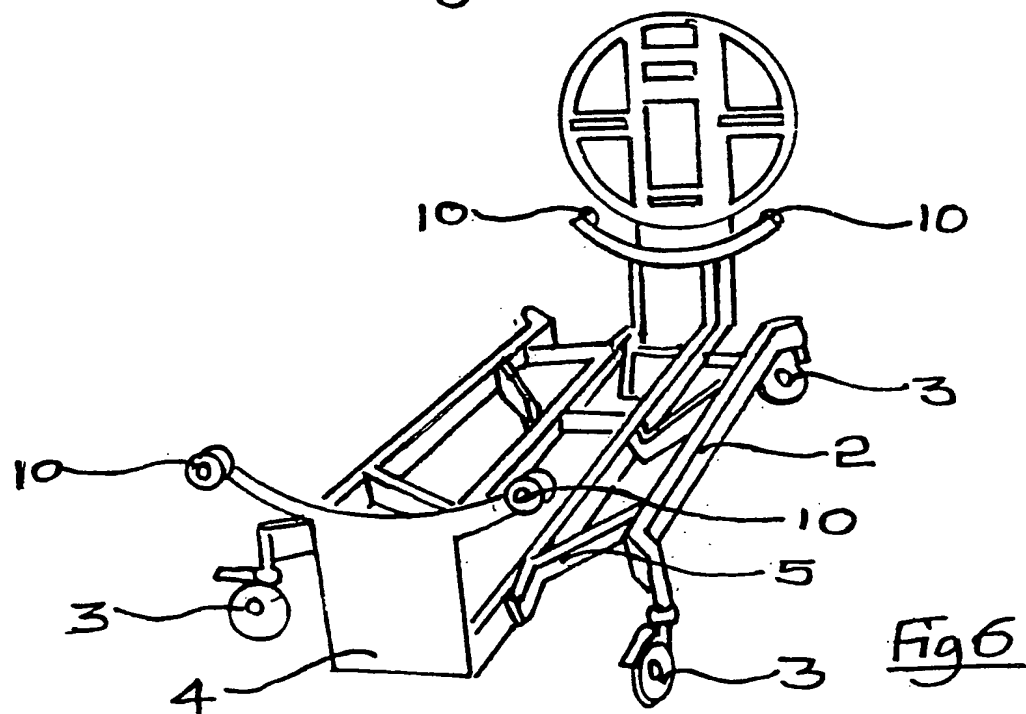
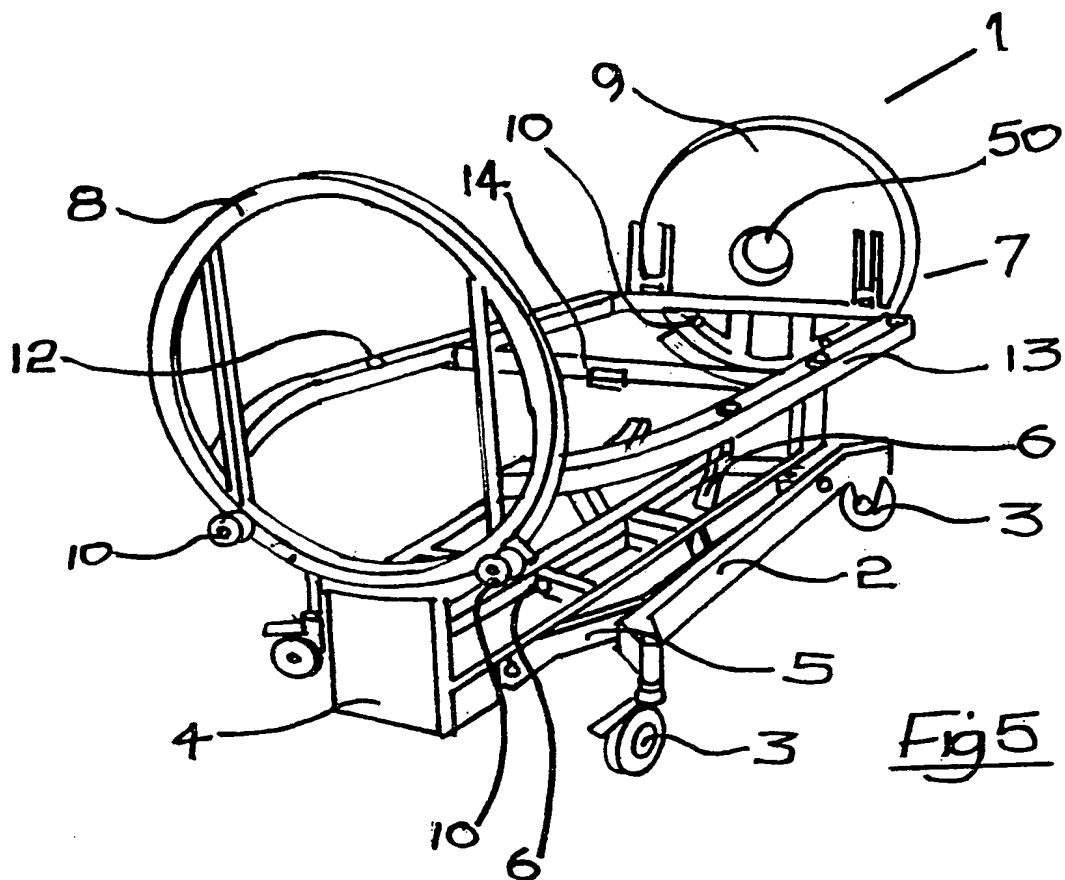


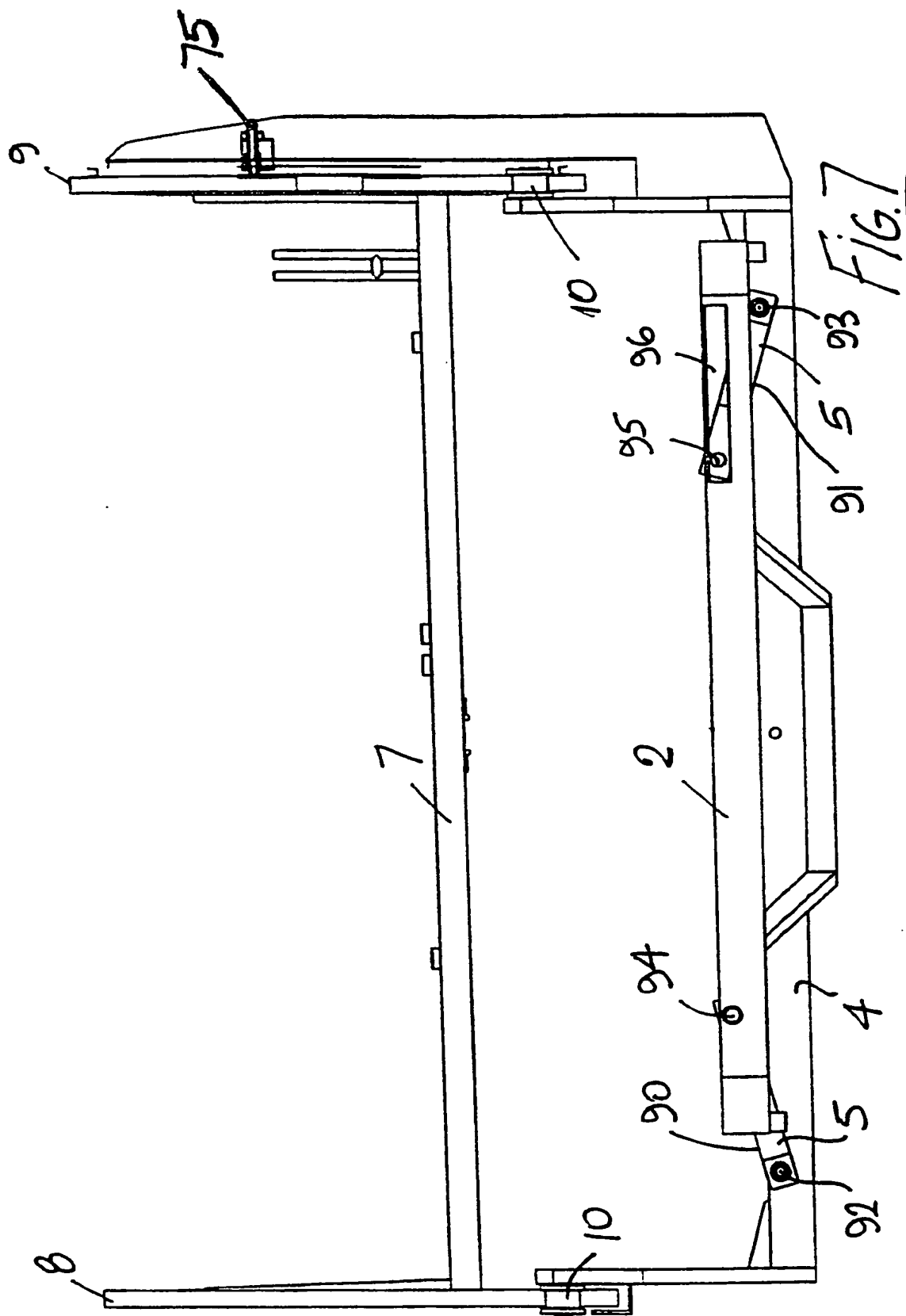






Fig 4





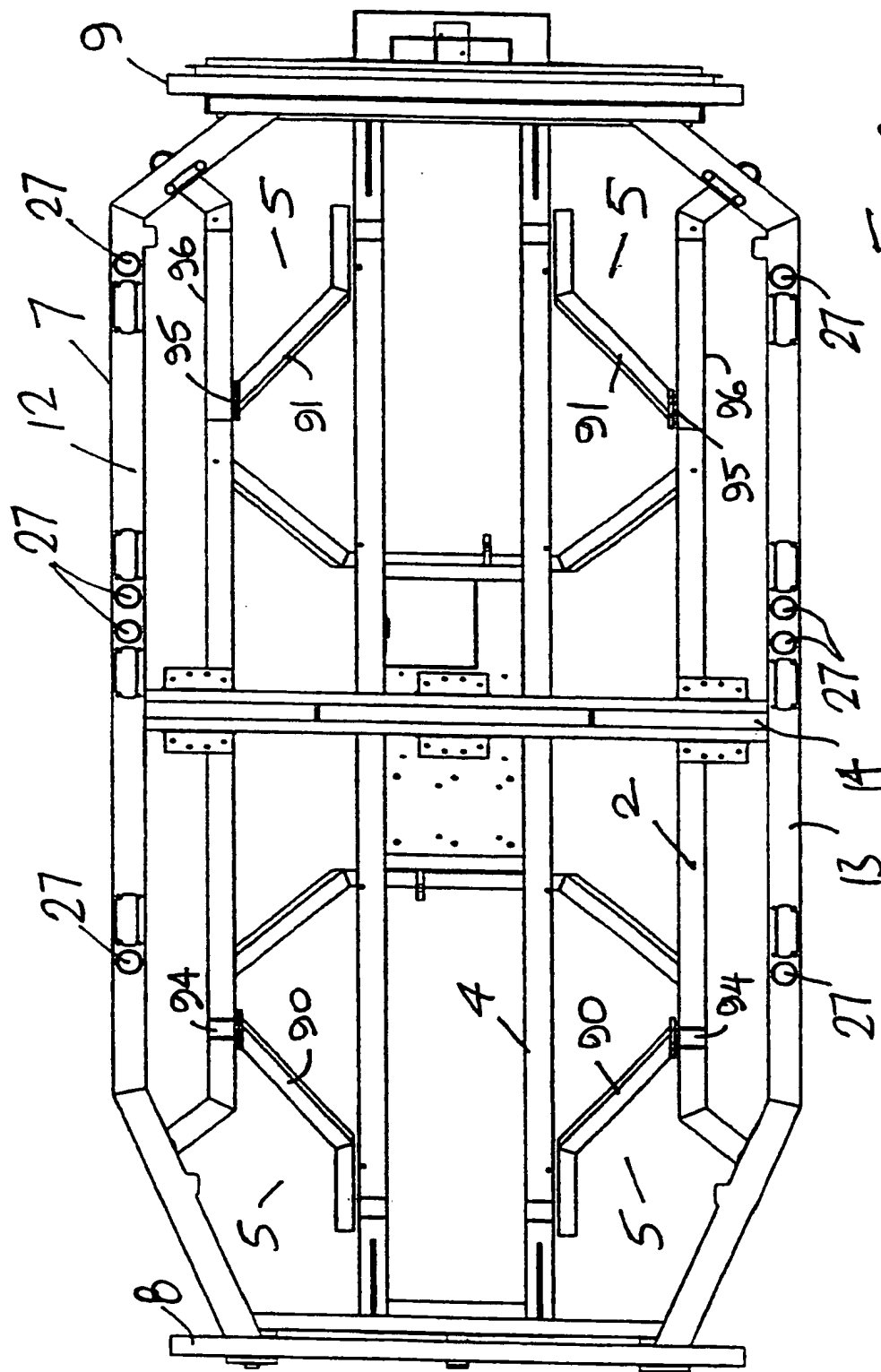
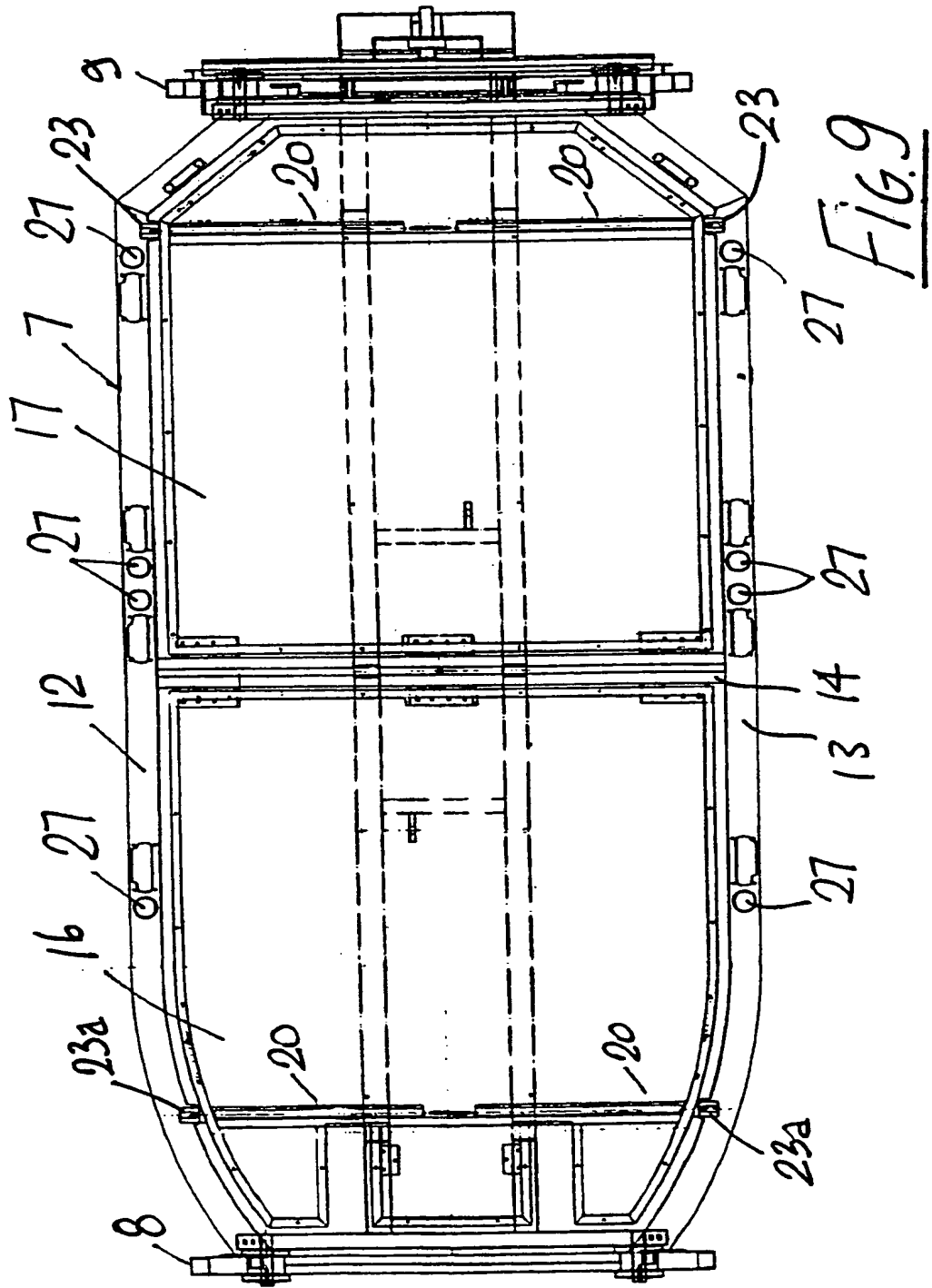


Fig. 8



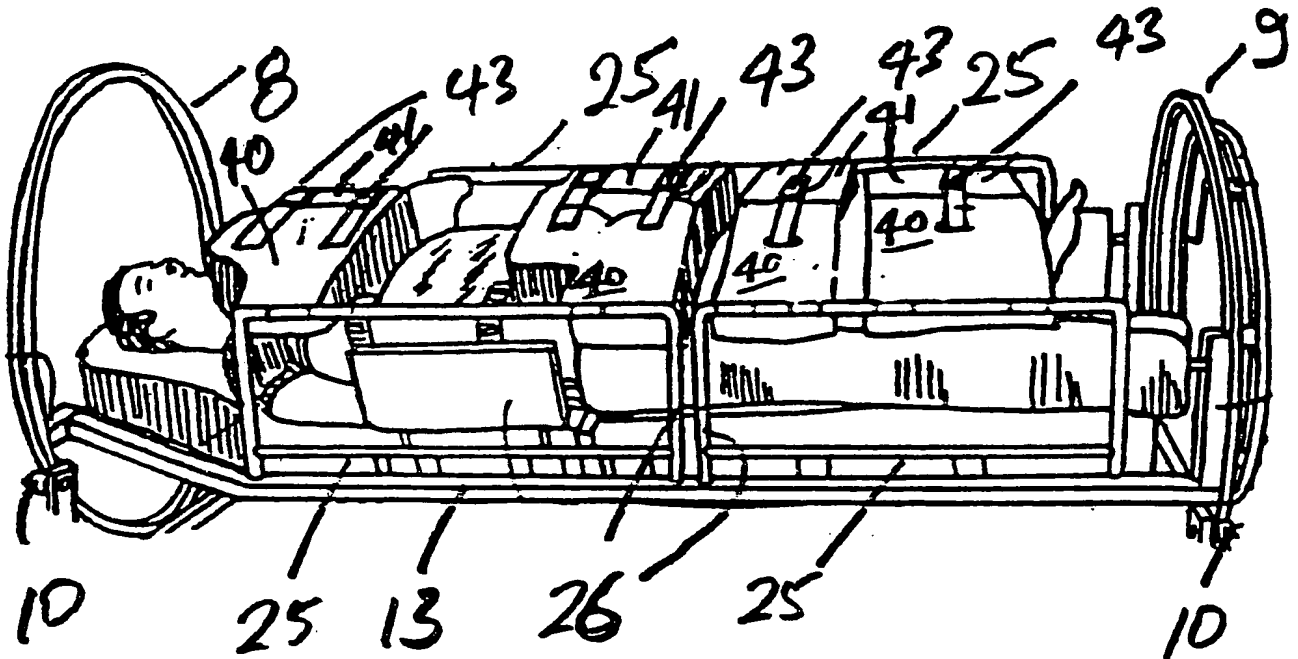


Fig. 10

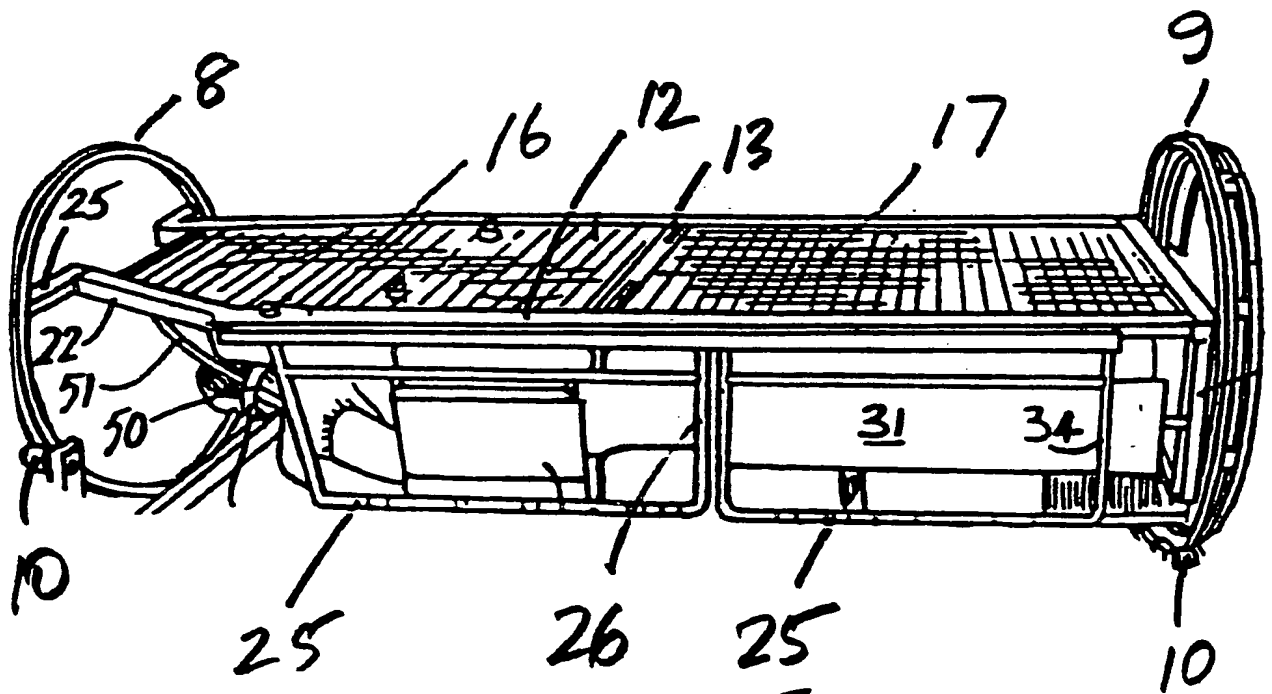
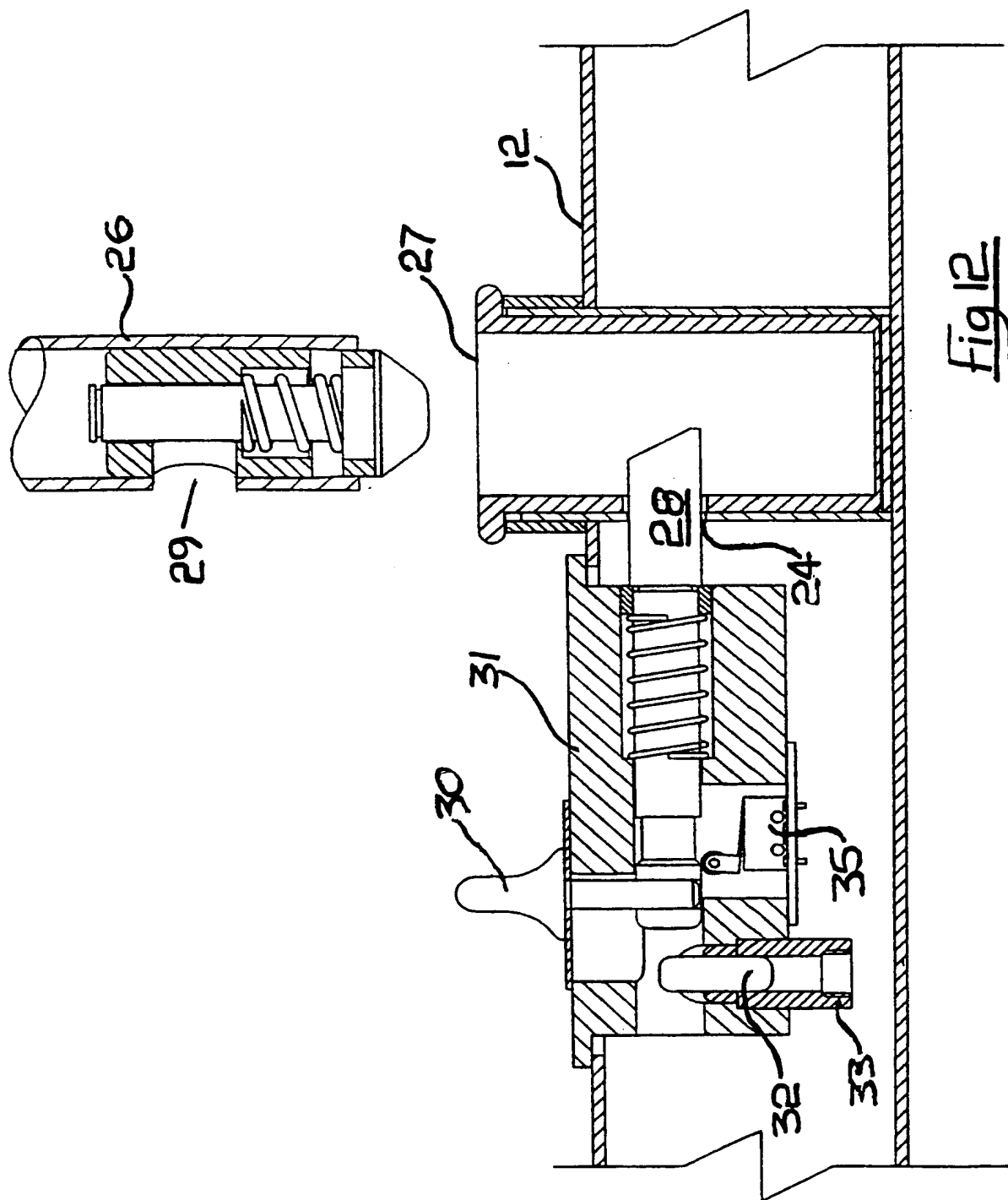


Fig. 11





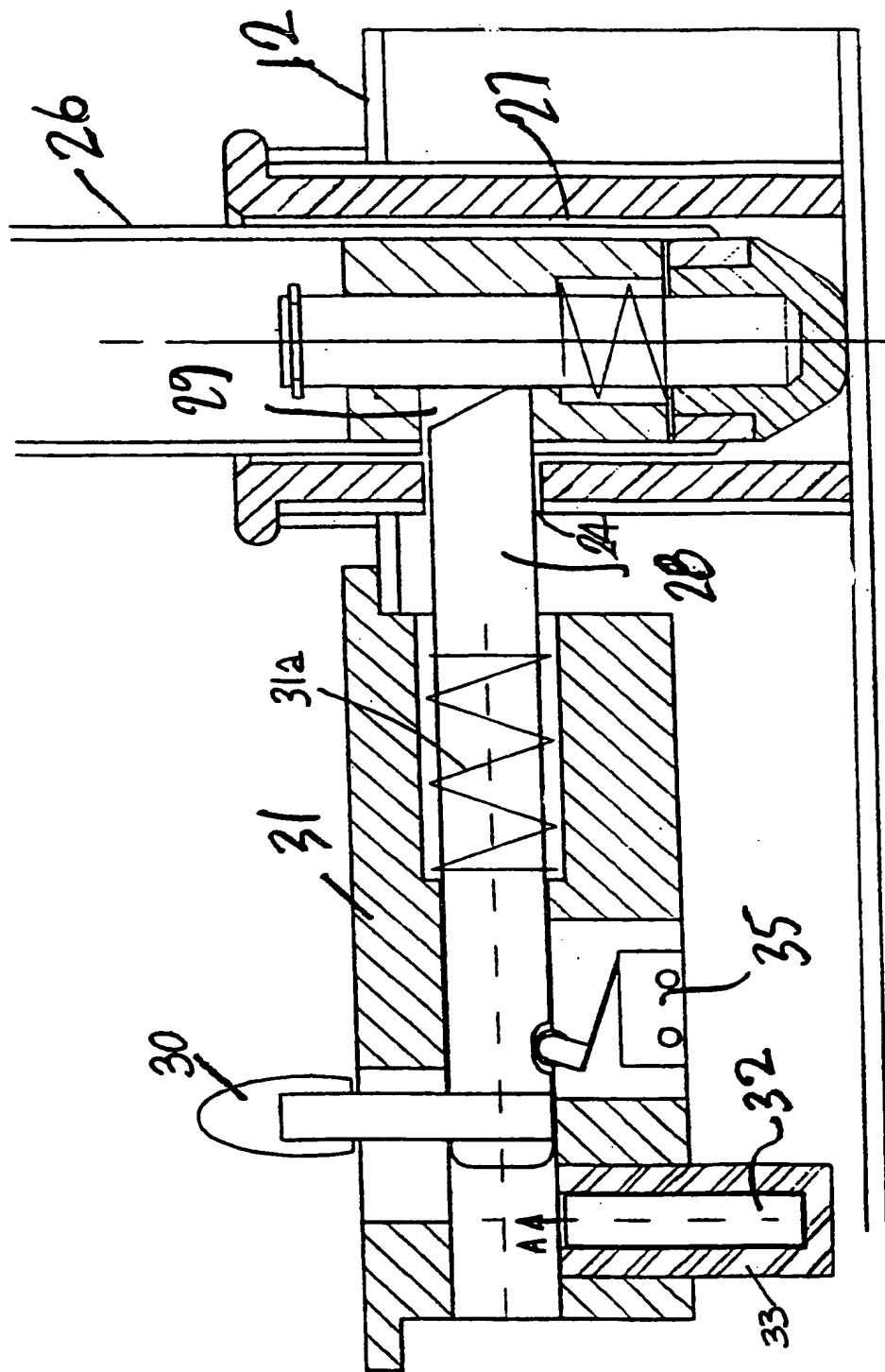


Fig 13

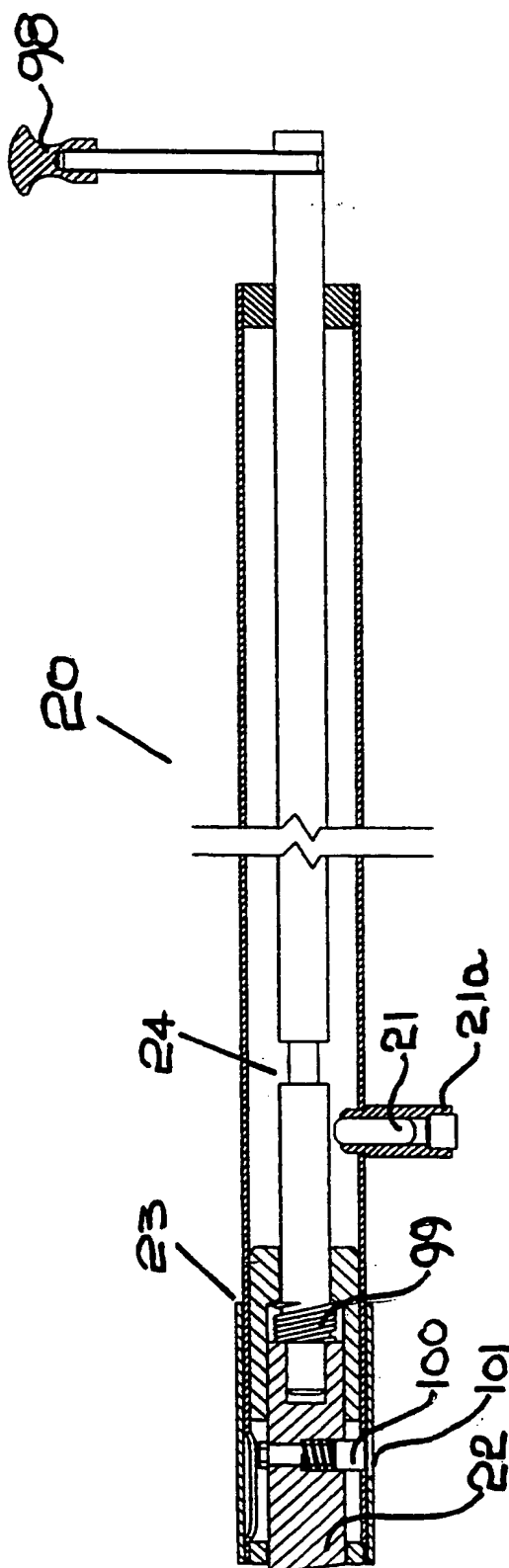


Fig 14

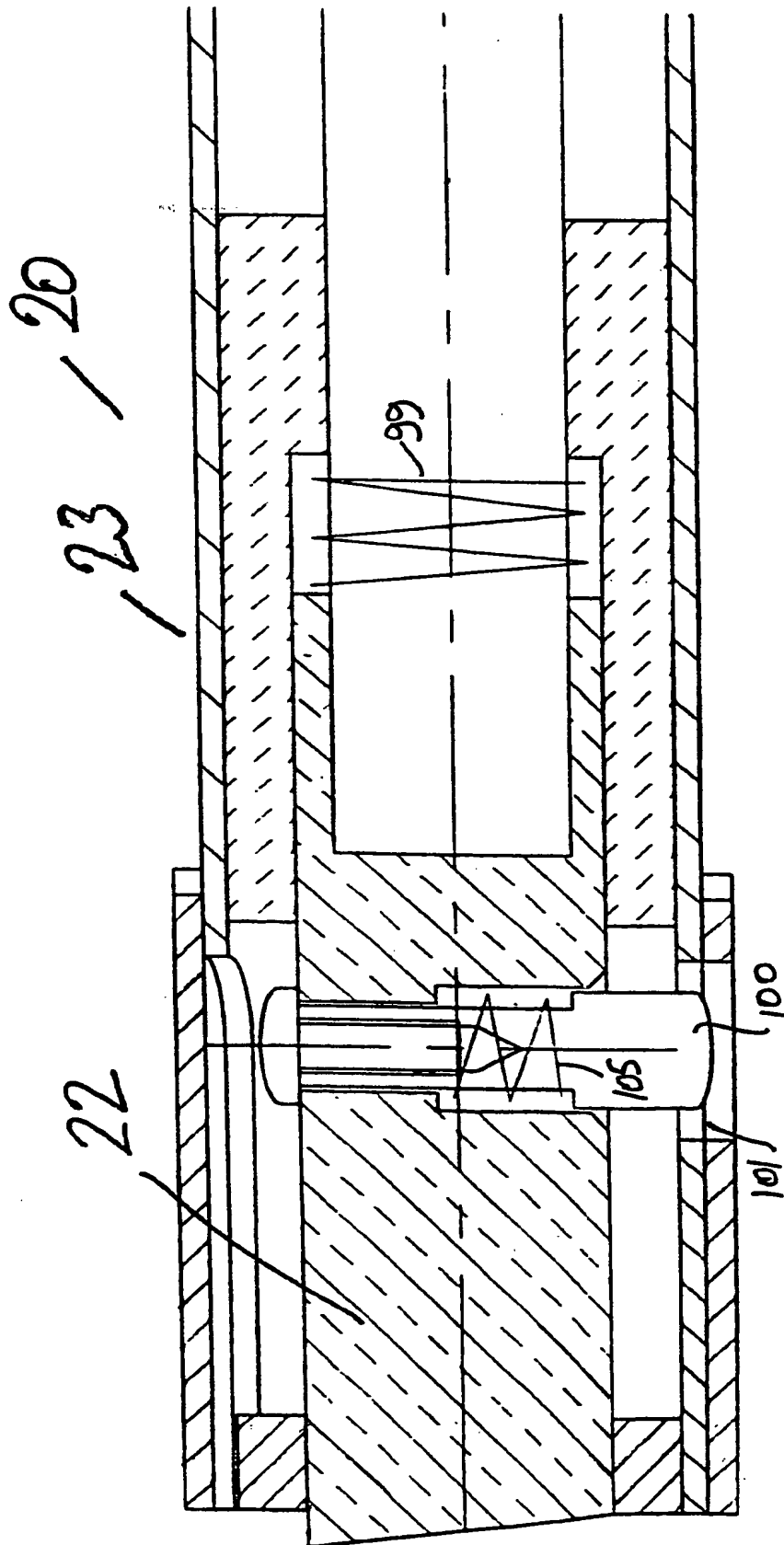


Fig. 15

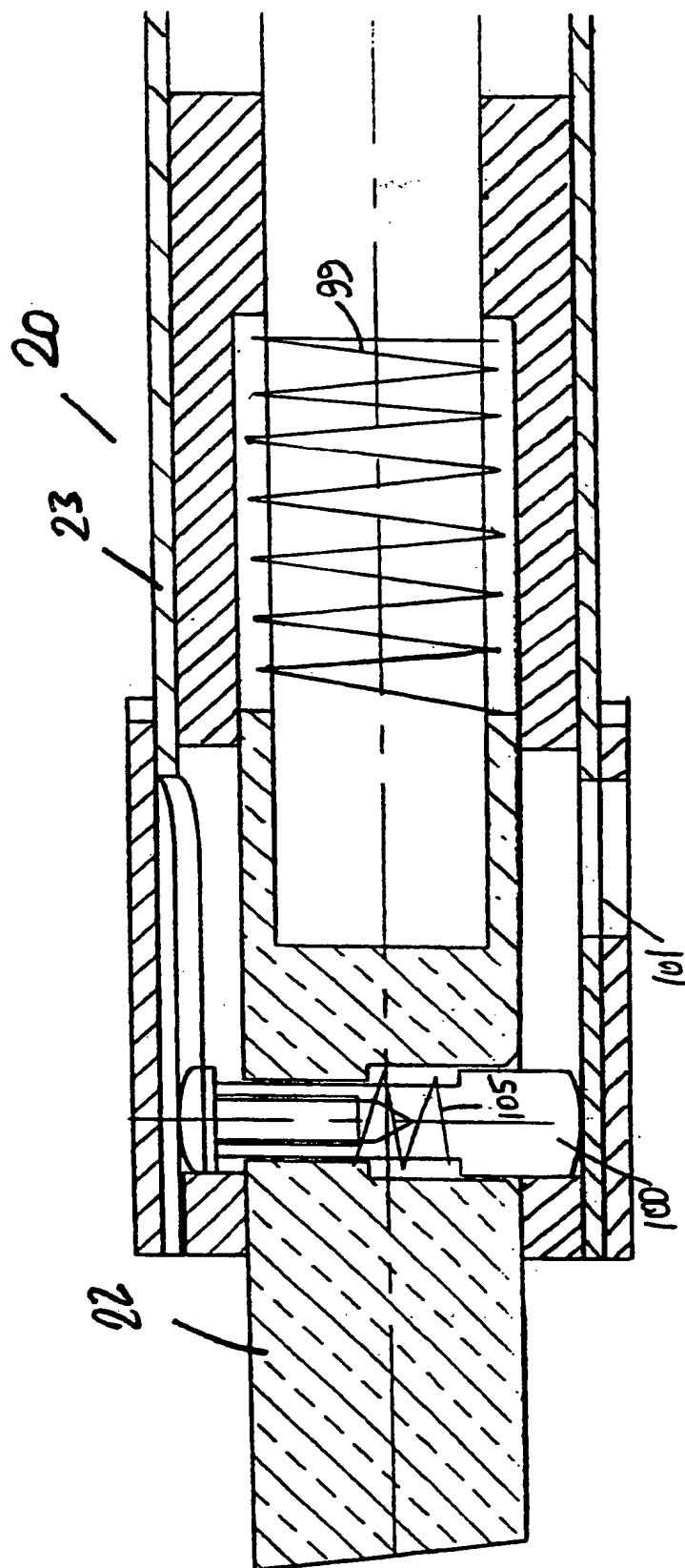
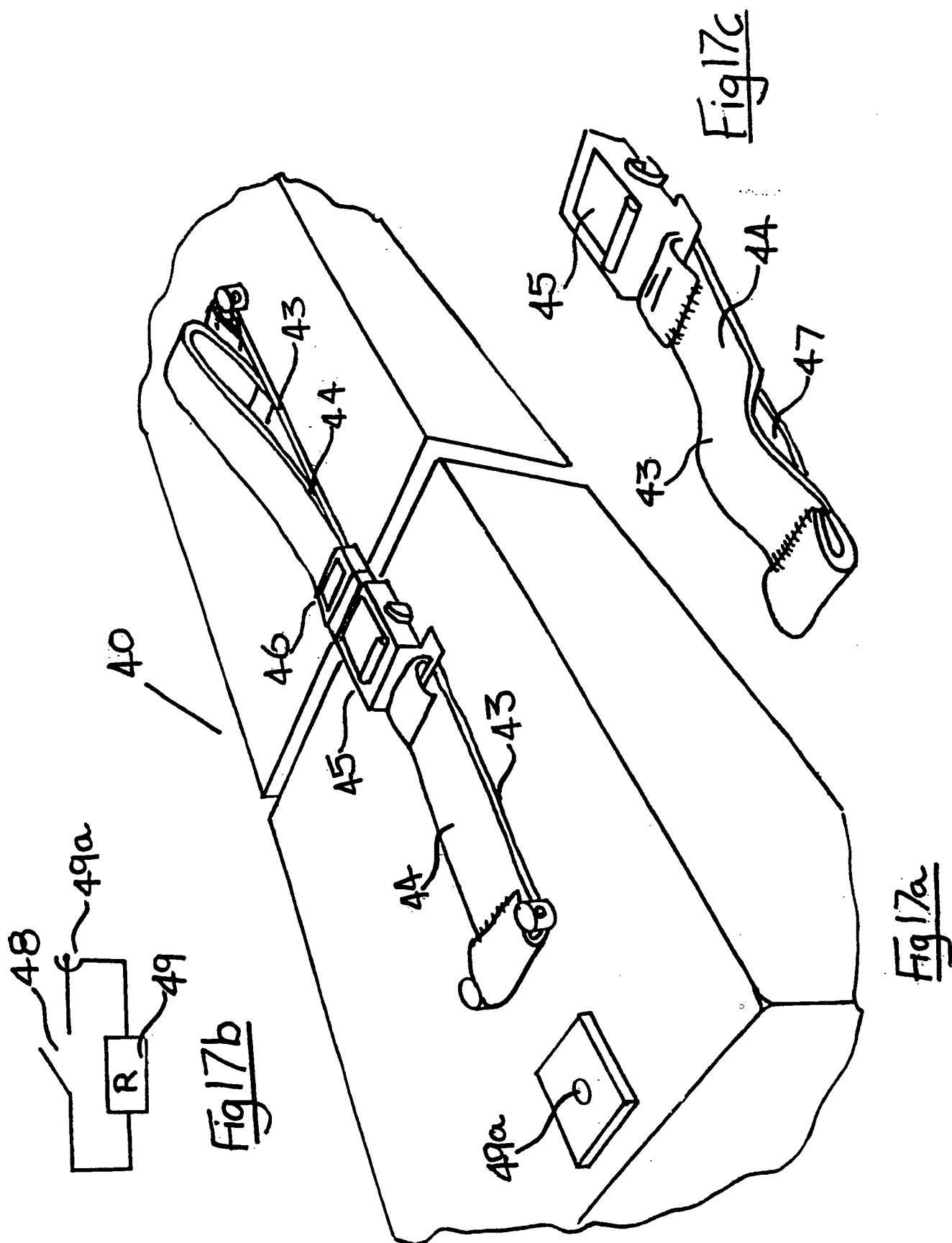
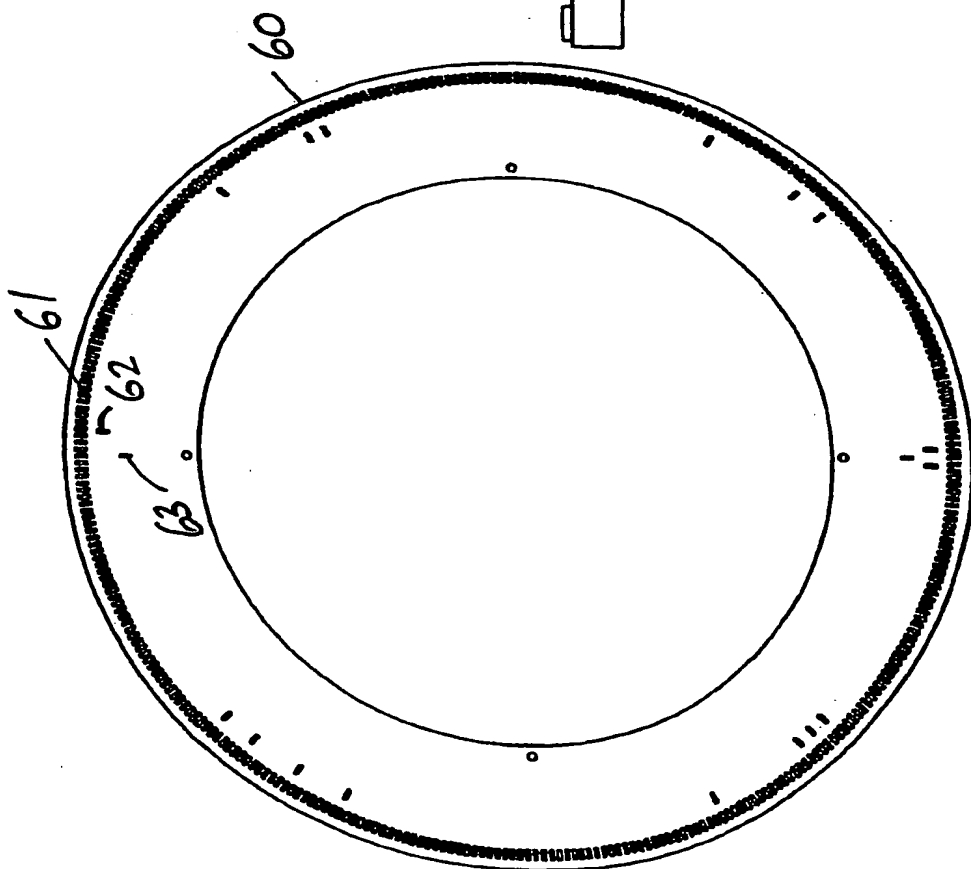
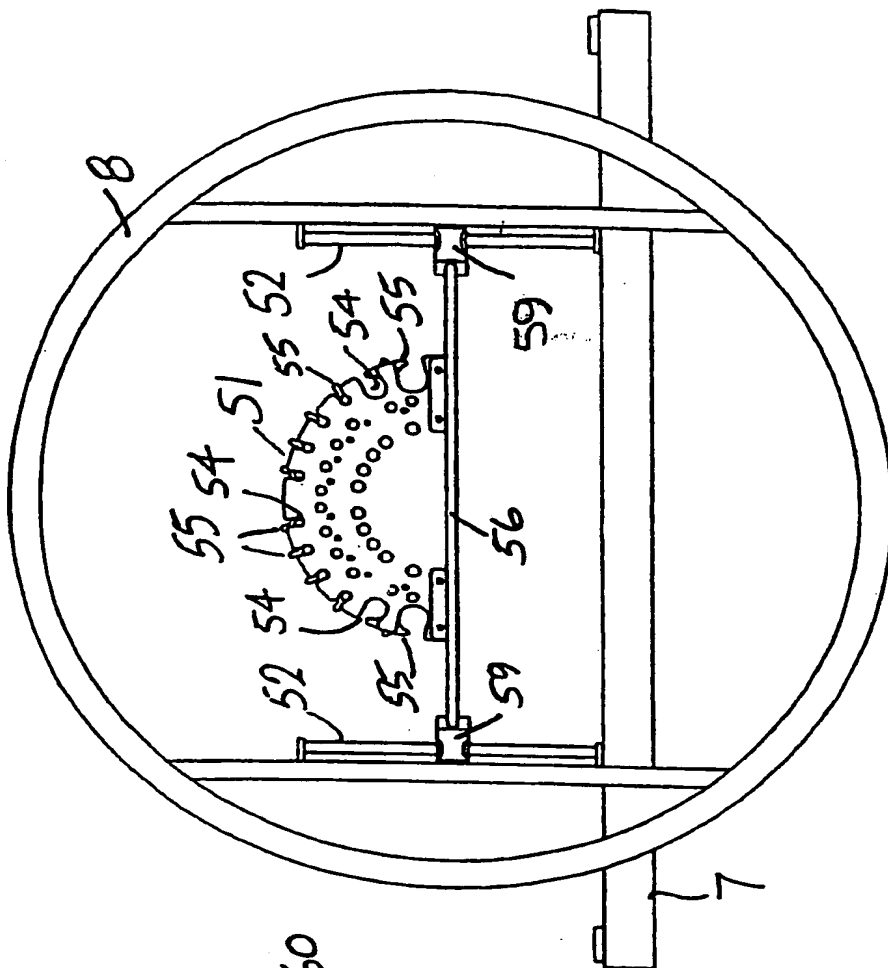
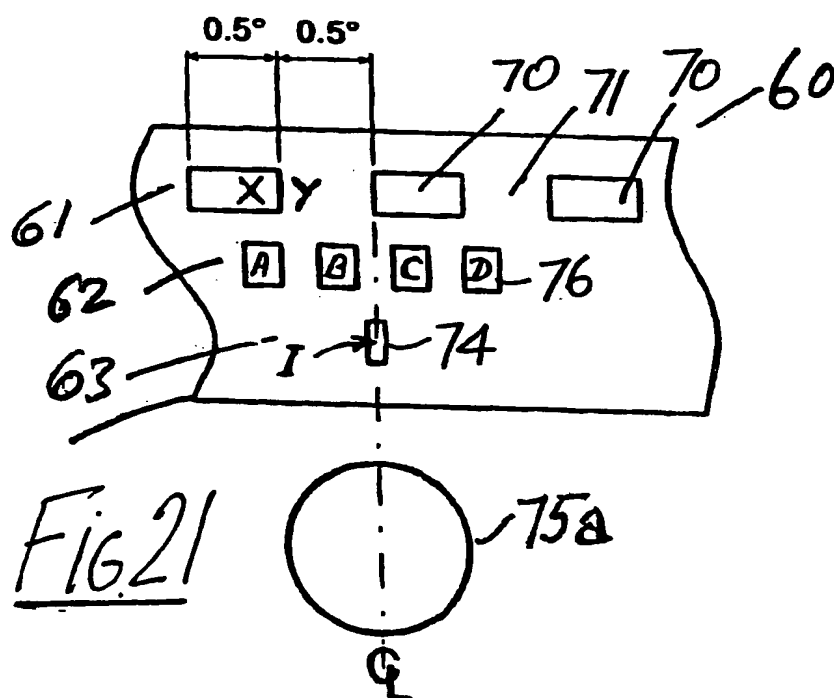
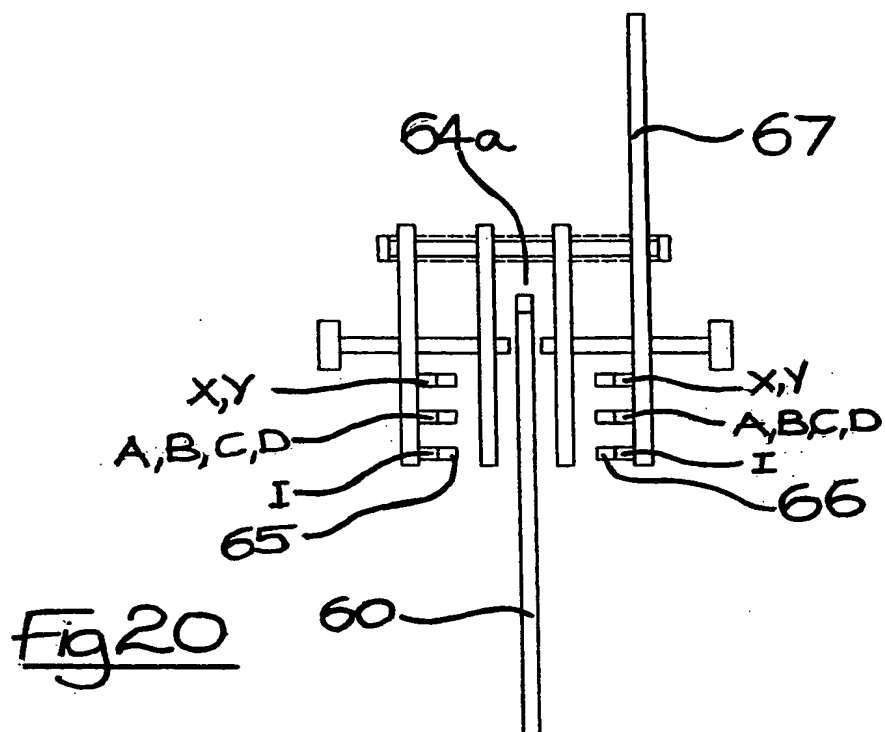


Fig. 6







## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IE 99/00049

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61G7/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 44 29 062 A (WIENAEBER MANFRED ;LUDWIG MANFRED DR MED (DE)) 22 February 1996 (1996-02-22)	1
A	column 4, line 15 -column 6, line 15; figures 1-5	19
A	--- WO 97 22323 A (ALLIANCE INVESTMENTS LTD ;CONNOLLY PATRICK J (IE)) 26 June 1997 (1997-06-26) cited in the application the whole document	1,12,16, 19
A	--- WO 96 27356 A (ALLIANCE INVESTMENTS LTD ;CONNOLLY PATRICK JOSEPH (IE); KEENAN EUG) 12 September 1996 (1996-09-12) page 18, line 3 - line 13; figures 1-10,19 --- -/--	1,20

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

17 September 1999

Date of mailing of the international search report

23/09/1999

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IE 99/00049

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 434 165 A (KEANE FRANCIS XAVIER) 25 March 1969 (1969-03-25) column 1, line 25 -column 2, line 29; figures ---	1
A	GB 1 516 488 A (KEANE F) 5 July 1978 (1978-07-05) page 1, line 50 - line 66; figures -----	12

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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